

REMARKS

Claim 1 has been amended. Claims 4, 5 and 12-14 have been canceled. New claims 16 and 17 have been added. Thus, Claims 1, 6-11 and 15-17 are now pending in the present application. Support for the amendment to claim 1 may be found in the specification at paragraph [0025] which states that "adamantyl groups are particularly desirable", and the general formula (II-a) shown at paragraph [0029], in which the oxygen atom is bonded at the 1-position of an adamantyl group. Support for new claims 16 and 17 may be found in canceled claims 2 and 3, respectively. Thus, no new matter has been added. Reconsideration of the application in view of the following comments is respectfully requested.

Claim objections

The Examiner objected to claim 1 because it contained two periods. Appropriate correction has been made. Thus, reconsideration and withdrawal of the claim objection are respectfully requested.

Claim 4 was objected to based on a misspelling of "adamantyl." Claim 4 has been canceled.

In view of the claim amendments discussed above, Applicants respectfully request reconsideration and withdrawal of the claim objections.

Rejections under 35 U.S.C. §112

Claim 13 was rejected under 35 U.S.C. §112, first and second paragraphs. Although Applicants do not agree with the rejection, claim 13 has been canceled solely to expedite prosecution of the application, thus rendering the rejections moot.

Rejections under 35 U.S.C. § 103(a)

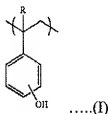
Claims 12 and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Adams et al. Although Applicants do not agree with the rejection, claims 12 and 14 have been canceled solely to expedite prosecution of the application, thus rendering the rejection moot.

Claims 1 and 4-11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Malik et al. (US 6,133,412) in view of Malik et al. (SPIE Vol. 3678). However, as explained below, this combination of references fails to render the claimed invention obvious.

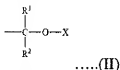
Claim 1 as amended recites:

a positive resist composition, comprising a resin component (A) which contains acid dissociable, dissolution inhibiting groups, and exhibits increased alkali solubility under action of acid, and an acid generator component (B) that generates acid on exposure, wherein

said resin component (A) is a polymer comprising structural units (a1) represented by a general formula (I) shown below, and a portion of hydroxyl groups of said structural units (a1) are protected by substituting hydrogen atoms of said hydroxyl groups with acid dissociable, dissolution inhibiting groups represented by a general formula (II) shown below:



(wherein, R represents a hydrogen atom or a methyl group)



(wherein, R¹ represents an alkyl group of 1 to 5 carbon atoms, R² represents a hydrogen atom, X represents an adamantyl group, and the oxygen atom in the general formula (II) is bonded at the 1-position of the adamantyl group as X.)

In the Office Action at page 9, the Examiner states that claim 15 would be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims. A portion of the subject matter of claim 15 has been incorporated into claim 1. In particular, the presently claimed invention recites that X represents an adamantyl group, and the oxygen atom in the general formula (ii) is bonded at the 1-position of the adamantyl group as X. The subject matter of claim 1 is nonobvious over the Malik et al. references because: (1) in Malik et al., a hydroxystyrene-based structural unit containing an acetal-type acid dissociable, dissolution inhibiting group does not contain an adamantyl group in the acid dissociable, dissolution inhibiting group; and (2) from the method for producing an acetal derivatized polymer described in Malik et al., a compound having the structure "-O-CH(CH₃)-O-X" cannot be produced. Thus, the Malik et al. references neither teach nor suggest an acid dissociable, dissolution inhibiting group represented by the general formula (II) recited in present

claim 1. As such, claim 1, and the claims dependent thereon, are clearly patentable over the cited combination of references.

Unexpected results

In addition, the present invention can achieve such a distinguished effect as excellent etching resistance, by containing the above constitution as a component. The evidence that supports the showing of unexpected results includes the following:

Examples 7-10, where mixed resins are used as recited in claim 1, resulting in rectangular cross-sectional shape of resist pattern and no pattern collapse (Example 7) and an excellent level of etching resistance (Examples 8-10).

Examples 1, 2, 5 and 6, where single (not mixed) resins and protection by adamantyl groups are used (claim 12), resulting in excellent resolution, rectangular cross-sectional shape of the resist pattern and no pattern collapse (Example 1); and an excellent level of etching resistance (Examples 2, 5 and 6).

Comparative Example 1 uses a resin protected by 1-ethoxyethyl groups which is not encompassed by the present claims, resulting in an inferior etching resistance to that observed in Examples 1-10. Furthermore, some pattern collapse was also observed in connection with Comparative Example 1.

Examples 3 and 4 are additional examples in which a protecting group other than adamantyl was used. In these examples, the protecting group is a naphthyl group. In both examples, etching resistance was only 10% better than the inferior results seen with Comparative Example 1. Moreover, the shape of the resist pattern was tapered, rather than being completely rectangular.

Thus, Examples 7-10 and Examples 1, 2, 5 and 6 indicate not only a much improved level of etching resistance in comparison to Comparative Example 1 and Examples 3-4, but also superior results in terms of prevention of pattern collapse and in rectangularity of the resist pattern. That is, the constituent features that "The component (A) is a mixture of a polymer and a copolymer (present claim 1)." and "The acid dissociable, dissolution inhibiting groups have adamantyl groups (present claim 12)" result in a positive resist composition that has significant unexpected, advantageous properties.

These unexpected results would effectively rebut any prima facie case of obviousness, even if one were present, and are strong evidence of the nonobviousness of the claimed invention.

In view of the claim amendments and comments presented above, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. §103(a).

Obviousness-type double patenting

Claim 12 was provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 6 of copending Application No. 10/586,694. Although Applicants do not agree with the rejection, claim 12 has been canceled solely to expedite prosecution of the application, thus rendering the rejection moot.

CONCLUSION

In view of the foregoing amendments and comments, it is respectfully submitted that the present application is fully in condition for allowance, and such action is earnestly solicited. If any minor issues remain which could be resolved by telephone, the Examiner is invited to contact the undersigned at the number provided below.

Respectfully submitted,

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